African Journal of Urology (2016) **22**, 47–53

African Journal of Urology

Official journal of the Pan African Urological Surgeon's Association
web page of the journal

www.ees.elsevier.com/afju
www.sciencedirect.com

Review

Non-transecting bulbar urethroplasty using buccal mucosa

S. Bugeja *, S. Ivaz , A.V. Frost , D.E. Andrich , A.R. Mundy

University College London Hospital, Reconstructive Urology Unit, UK

Received 6 September 2015; accepted 30 September 2015
Available online 2 December 2015

KEYWORDS
Urethral stricture;
Bulbar urethroplasty;
Non-transecting;
Buccal mucosal graft

Abstract
Augmentation urethroplasty using oral mucosal graft has become the standard surgical treatment of long bulbar strictures. In very tight strictures the urethral plate is narrowed to the extent that an almost circumferential substitution with oral graft is necessary, with suboptimal results. If the obliterative segment within a longer stricture is short it is possible, through a dorsal stricturotomy, to excise it in a non-transecting manner, leaving the ventral spongiosum intact and anastomose the mucosal edges to reconstitute the urethral plate to an adequate calibre. The stricturotomy is subsequently augmented with an oral mucosal graft. We describe this technique as the augmented non-transecting anastomotic bulbar urethroplasty. It also allows for use of a narrower and shorter graft. In our hands this procedure is associated with a 100% radiological success rate and a 95% patient satisfaction rate at a mean follow-up of 14.8 months (5.7–52.6 months).

Introduction

The surgical treatment of bulbar urethral strictures, and indeed any urethral stricture, is determined by their aetiology, length, location and by previous surgical intervention [1]. Traditionally, short idiopathic bulbar strictures (typically 1–2 cm long) have been successfully managed by excision of the strictured urethral segment (the spongiofibrosis and the surrounding corpus spongiosum) and tension-free end-to-end anastomosis of the healthy spatulated edges (so called excision and primary anastomosis – EPA) [2,3]. This is associated with excellent long term functional results [4,5] but concerns have been raised about the potential consequences of transecting the spongiosum and disrupting the integrity of the spongiosal blood flow. We have therefore pioneered the non-transecting technique for short idiopathic bulbar strictures [6] which does not disrupt retrograde urethral blood flow and which is possible because of the pathophysiology of these strictures (as opposed to traumatic ones).

Longer bulbar strictures are considered to be unsuitable for excision and anastomosis due to the risk of tension on the anastomosis leading

* Corresponding author at: Reconstructive Urology, University College London Hospital, Ground Floor Central, 250 Euston Road, NW1 2PG London, UK.
E-mail address: simbugi@gmail.com (S. Bugeja).

Peer review under responsibility of Pan African Urological Surgeons' Association.

http://dx.doi.org/10.1016/j.afju.2015.09.004

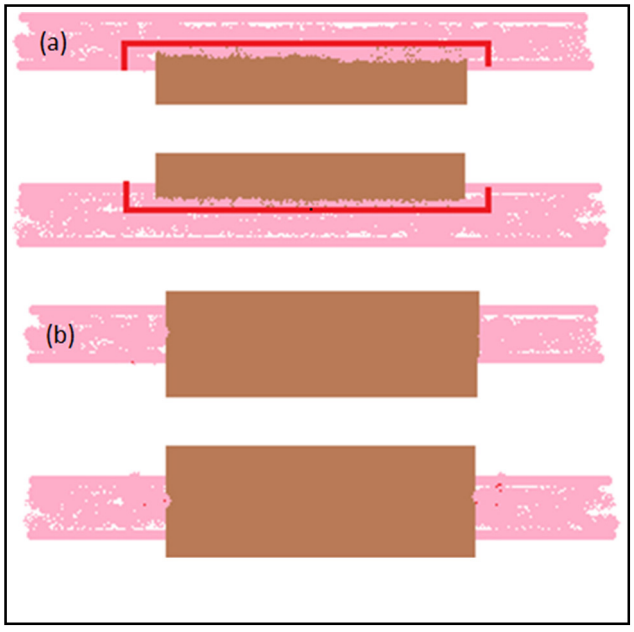

Figure 1 Diagramatic representation showing (a) superficial spongiofibrosis typical of idiopathic bulbar strictures as opposed to (b) the generally transmural fibrosis associated with traumatic strictures. The red line represents the plane through which spongiofibrosis is excised in a non-transecting manner.

to increased stricture recurrence. Shortening of the penis and curvature during erection are added concerns [7]. These longer strictures are therefore routinely managed by an augmentation procedure, most commonly using an oral mucosal graft, without excision of the stricture [8]. Longer traumatic bulbar strictures which require excision, are usually treated by an augmented anastomotic approach in which, following stricture excision, the ventral aspect of the circumference of the urethra is anastomosed in an end-to-end fashion and the dorsal hemi-circumference is augmented with an oral mucosal graft [4].

Based on these surgical principles, we have been able to combine the use of the non-transecting anastomotic technique and oral mucosal graft augmentation, for longer bulbar strictures in selected instances. We refer to this as the augmented non-transecting anastomotic bulbar urethroplasty (ANTABU). This paper describes the technique of ANTABU and explains the underlying stricture pathophysiology which makes this approach possible. We describe the characteristics of those strictures which are suitable for this technique and the advantages and limitations of the procedure and our experience with it.

Principles underlying non-transection

The pathology of bulbar strictures differs between idiopathic and post-traumatic (fall-astride) causes even if the strictures are identical in length and location. In the former, the degree of spongiofibrosis is often surprisingly small, limited to around 10% of the thickness of the urethral wall, with well-preserved healthy underlying corpus spongiosum present [9] (Fig. 1a). This is in contrast to strictures following perineal trauma in which spongiofibrosis is usually transmural with no remaining vascularised spongiosal tissue [10] (Fig. 1b).

There is therefore no doubt that in traumatic bulbar strictures, transection with complete excision of the strictured segment is mandatory since failure to do so may lead to stricture recurrence in the long term. However, in cases of EPA for non-traumatic bulbar urethral strictures a significant proportion of the excised urethra is indeed healthy vascularised tissue but the nature of the procedures requires transection of the corpus spongiosum and, inevitably, of the urethral arteries within it. Although it is not certain whether this disruption of the retrograde urethral blood flow leads to adverse effects in the long-term, preservation of blood supply is always desirable particularly when the distal vascular supply to the urethra is compromised such as the elderly, those with peripheral vascular disease or micro-vascular disease, hypospadias, previous urethroplasty and patients who may subsequently be candidates for artificial urinary sphincter implantation and might be at increased risk of ischaemic erosion [11].

Surgical technique – augmented non-transecting anastomotic bulbar urethroplasty

All patients are assessed clinically and by means of flow rate study, antegrade/retrograde urethrogram and a preoperative symptom and quality of life questionnaire [12,13]. They are admitted to hospital on the day of surgery. Informed consent is obtained in the clinic beforehand and confirmed on review immediately before the surgery. The procedure is performed under antibiotic prophylaxis (gentamycin and co-amoxiclav usually) administered at induction of anaesthesia. Nasal intubation is standard to allow access to the oral cavity if harvesting of an oral mucosal graft is required. The patient is positioned in 'social' lithotomy which provides good surgical exposure of the perineum and has a very low incidence of complications [14]. The legs are supported in Allen® Yellofin® stirrups. Anti-thromboembolic stockings and pneumatic intermittent calf compression devices are used routinely. After shaving the perineum the skin is 'prepped' using a 2% chlorhexidine gluconate and 70% isopropyl alcohol formulation (ChloraPrep®) and the area draped.

A floppy-tipped hydrophilic guidewire is advanced across the stricture at the start of the procedure in order to facilitate identification of the lumen in very tight strictures once the stricturotomy is made. A midline perineal incision is performed and deepened through the bulbospongiosus muscle to expose the bulbar urethra. Incision of Gallaudet's fascia allows access to the plane between the urethra and the muscle (Fig. 2a). The bulbar urethra is mobilised proximally and distally off the corpora cavernosa dorsally by incision of Buck's fascia (Fig. 2b). A 20F Foley catheter is passed up the urethra to identify the distal end of the stricture. A dorsal stricturotomy is then performed by cutting onto the tip of this catheter held in position at this level (Fig. 3a). The stricturotomy is then extended proximally, with the help of a gorget (Fig. 3b), and distally into normal calibre urethra at either end.

The type of urethroplasty performed will then depend on the length and location of the stricture. If the stricture is generally at the junction of the proximal and middle thirds of the bulbar urethra, short and membrane-like (1–2 mm long), the dorsal stricturotomy can be simply closed transversely after having adequately mobilised the bulbar urethra distally to allow a tension-free closure (Fig. 4). This is a Heineke–Mikulicz-type strictureplasty without excising the stricture [15].